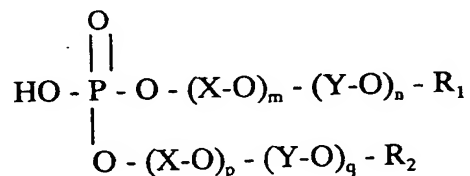


## CLAIMS

1. - A method of treating mineral fillers, characterised in that said filler

a) is treated using at least one compound of the general formula (1):



where  $\text{R}_1$  = either H or alkyl with 8 to 40 carbon atoms or aryl or alkylaryl or arylalkyl with 6 to 40 carbon atoms

where  $\text{R}_2$  = either alkyl with 8 to 40 carbon atoms or aryl or alkylaryl or arylalkyl with 6 to 40 carbon atoms

$\text{X} = -\text{CH}_2-\text{CH}_2-$  or  $-\text{CH}(\text{CH}_3)-\text{CH}_2-$

or  $-\text{CH}_2-\text{CH}(\text{CH}_3)-$  or  $-(\text{CH}_2)_5-\text{CO}-$

$\text{Y} = -\text{CH}_2-\text{CH}_2-$  or  $-\text{CH}(\text{CH}_3)-\text{CH}_2-$

or  $-\text{CH}_2-\text{CH}(\text{CH}_3)-$  or  $-(\text{CH}_2)_5-\text{CO}-$

X and Y being the same or different,

(m+n) varies from 0 to 60 (boundaries included) as well as (p+q) where  $0 \leq m+n \leq 60$  and  $0 \leq$

$p+q \leq 60$  when  $\text{X}=\text{Y} = -\text{CH}_2-\text{CH}_2-$

and

where  $(1 \leq m \leq 10 \text{ and } 1 \leq p \leq 10)$  and  $(0 \leq n \leq 59 \text{ and } 0 \leq q \leq 59)$  if X is different from Y.

b) undergoes a de-agglomeration step and

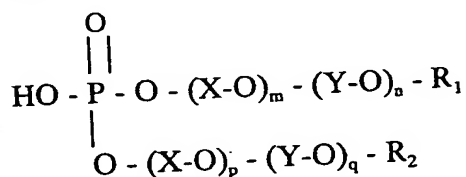
c) optionally undergoes a selection step.

2. A method of treating mineral fillers as claimed in claim 1, characterised in that said treatment agent is an acid phosphate of aliphatic alcohol, branched or not with 8 to 20 carbon atoms, on which from 0 to 12 ethylene oxide chains are condensed and optionally containing a mixture of mono-esters and di-esters.

3. A method of treating mineral fillers as claimed in claim 1 or 2, characterised in that said treatment agent is a mixture of mono-ester and di-ester of acid phosphate of decyl alcohol with 5 mols of ethylene oxide.
4. A method of treating mineral fillers as claimed in claim 1, characterised in that said treatment agent is the mono-ester of acid phosphate of tristyrylphenol containing 60 mols of ethylene oxide.
5. A method of treating mineral fillers as claimed in claim 1 or 2, characterised in that said treatment agent is a mixture of mono-ester and di-ester of acid phosphate of ketostearyl alcohol.
6. A method of treating mineral fillers as claimed in claim 1 or 2, characterised in that said treatment agent is a mixture of mono-ester and di-ester of acid phosphate of nonylphenol containing 10 mols of ethylene oxide.
7. A method of treating mineral fillers as claimed in claim 1, characterised in that said treatment is applied by a dry method or by a wet method.
8. A method of treating mineral fillers as claimed in any one of claims 1 to 7, characterised in that said filler is selected from amongst: the carbonates, phosphates and sulphates of natural or synthetic alkaline earths, zinc carbonate, the combined salts of magnesium and calcium such as dolomites, lime, magnesia, barium sulphate, calcium sulphates, magnesium hydroxides, aluminium hydroxide, silica, wollastonite, the clays and other silico-alumina such as the kaolins, silica-magnesia such as talc, mica, solid or hollow glass beads, the metal oxides such as zinc oxide, the iron oxides, titanium oxide and mixtures thereof.
9. A method of treating mineral fillers as claimed in any one of claims 1 to 7, characterised in that said filler is selected from amongst: the natural calcium carbonates selected from chalk, calcite and marble, precipitated calcium carbonate, dolomite, the aluminum or magnesium hydroxides, kaolin, talc, wollastonite and mixtures thereof.

10. A treated mineral filler of a specific grain size for the manufacture of polyurethane foams by a method whereby said filler is mixed with at least some of the polyol in the reaction forming the polyurethane and having a shorter mixing time with the polyol and the other reagents, characterised in that it

a) is treated using at least one compound of the general formula (1):



where  $\text{R}_1$  = either H or alkyl with 8 to 40 carbon atoms or aryl or alkylaryl or arylalkyl with 6 to 40 carbon atoms

where  $\text{R}_2$  = either alkyl with 8 to 40 carbon atoms or aryl or alkylaryl or arylalkyl with 6 to 40 carbon atoms

$\text{X} = -\text{CH}_2-\text{CH}_2-$  or  $-\text{CH}(\text{CH}_3)-\text{CH}_2-$

or  $-\text{CH}_2-\text{CH}(\text{CH}_3)-$  or  $-(\text{CH}_2)_5-\text{CO}-$

$\text{Y} = -\text{CH}_2-\text{CH}_2-$  or  $-\text{CH}(\text{CH}_3)-\text{CH}_2-$

or  $-\text{CH}_2-\text{CH}(\text{CH}_3)-$  or  $-(\text{CH}_2)_5-\text{CO}-$

X and Y being the same or different,

$(m+n)$  varies from 0 to 60 (boundaries included) as well as  $(p+q)$  where  $0 \leq m+n \leq 60$  and  $0 \leq p+q \leq 60$  when  $\text{X}=\text{Y} = -\text{CH}_2-\text{CH}_2-$

and

where  $(1 \leq m \leq 10 \text{ and } 1 \leq p \leq 10)$  and  $(0 \leq n \leq 59 \text{ and } 0 \leq q \leq 59)$  if X is different from Y.

b) undergoes a de-agglomeration step and

c) optionally undergoes a selection step.

11. A treated mineral filler as claimed in claim 10, characterised in that said treatment agent is a mixture of mono-ester and di-ester of acid phosphate of decyl alcohol with 5 mols of ethylene oxide.

12. A treated mineral filler as claimed in claim 10, characterised in that said treatment agent is the mono-ester of acid phosphate of tristyrylphenol containing 60 mols of ethylene oxide.
13. A treated mineral filler as claimed in claim 10, characterised in that said treatment agent is a mixture of mono-ester and di-ester of acid phosphate of ketostearyl alcohol.
14. A treated mineral filler as claimed in claim 10, characterised in that said treatment agent is a mixture of mono-ester and di-ester of acid phosphate of nonylphenol containing 10 mols of ethylene oxide.
15. Mineral fillers as claimed in any one of claims 10 to 14, characterised in that they consist of carbonates, phosphates and sulphates of natural or synthetic alkaline earths, zinc carbonate, the combined salts of magnesium and calcium such as dolomites, lime, magnesia, barium sulphate, calcium sulphates, magnesium hydroxides, aluminium hydroxide, silica, wollastonite, the clays and other silico-alumina such as the kaolins, silica-magnesia such as talc, mica, solid or hollow glass beads, the metal oxides such as zinc oxide, the iron oxides, titanium oxide and mixtures thereof.
16. Mineral fillers as claimed in any one of claims 10 to 14, characterised in that they consist of natural calcium carbonates selected from chalk, calcite and marble, precipitated calcium carbonate, dolomite, aluminum or magnesium hydroxides, kaolin, talc, wollastonite and mixtures thereof.
17. Mineral fillers as claimed in anyone of claims 10 to 16, characterised in that they consist of products having an average diameter of between 0.1 and 15 micrometres, preferably between 0.1 and 10 micrometres.
18. Mineral fillers as claimed in any one of claims 10 to 16, characterised in that they consist of products having an average diameter of between 0.3 and 8 micrometres.
19. Mineral fillers as claimed in any one of claims 10 to 18, characterised in that they are selected from amongst the following: a marble with an average diameter of 8 micrometres, a magnesium hydroxide with an average diameter of between 1.4 and 1.8 micrometres, a talc

with an average diameter of 2.5 micrometres, a dolomite with an average diameter of 3 micrometres, an aluminium hydroxide with an average diameter of 0.8 micrometres, a kaolin with an average diameter of 0.5 micrometres, a precipitated calcium carbonate with an average diameter of 0.30 micrometres.

20. Mineral fillers as claimed in any one of claims 10 to 19, characterised in that they conserve their hydrophilic nature whilst exhibiting an up-take of polyol reduced by at least 15% and preferably at least 20% relative to the untreated mineral filler.

21. Suspensions of mineral fillers in polyols, characterised in that the filler is a filler as claimed in any one of claims 10 to 20.

22. Suspensions of mineral fillers in polyols, as claimed in claim 21, characterised in that the polyols used belong to the families of the polyethers and polyesters-polyethers and the polyesters, in particular, among the polyol polyethers the addition products of propylene oxide on a simple polyol such as glycol, glycerol, trimethylolpropane, sorbitol, in the presence of ethylene oxide or not, or the special polyol polyethers such as the amine-based polyethers obtained by the addition of propylene oxide or optionally ethylene oxide on amines, halogen polyethers, grafted polyethers resulting from the copolymerisation of styrene and acrylonitrile in suspension in a polyether, or alternatively polytetramethylene glycol, in particular among the polyol polyesters those resulting from the polycondensation of polyalcohols on polyacids or their anhydrides, such as the diacids, such as adipic, phthalic or other diacids, reacting with diols such as ethylene glycol, propylene glycol, butylene glycol or others, triols such as glycerol, trimethylolpropane or others and tetrols such as pentaerythritol or others, alone or in a mixture, or various hydroxyl compounds such as hydroxylated polybutadienes, the prepolymers with hydroxyl terminations resulting from the reaction of excess polyol on a diisocyanate or the simple polyols such as glycerol, amino alcohols used in a small quantity with the polyol polyethers or the polyol polyesters.

23. Suspensions of mineral fillers in polyols as claimed in claim 21 or claim 22, characterised in that they contain other mineral and/or organic products such as catalysts and/or anti-oxidants and/or others.

24. Suspensions of mineral fillers in polyols as claimed in any one of claims 21 to 23, characterised in that the concentration of dry substance of the treated mineral substances may be as high as 80% by weight, and in that they are not susceptible either to decantation or sedimentation or damming thickening after storage for 7 days in readiness for the manufacture of flexible, semi-rigid or rigid polyurethane foams, i.e. having a stable apparent Brookfield viscosity which is lower than that of suspensions of mineral fillers which have not been treated and in that they contain 0.5% to 3% by weight, relative to the weight of the mineral filler, of at least one treatment agent having the general formula (1).

25. Pre-mixtures of mineral fillers with a polyol and in particular in proportions appropriate for the manufacture of polyurethanes and more specifically polyurethane foams either by foaming without an auxiliary blowing agent or by foaming with an auxiliary blowing agent such as methylene chloride, acetone or  $\text{CO}_2$  or others, or composite polyurethanes, characterised in that the fillers are pre-treated by a method as claimed in any one of claims 1 to 9.

26. Pre-mixtures of mineral fillers with a polyol as claimed in claim 25, characterised in that the filler consists of a filler such as described in any one of claims 15 to 19, in particular natural calcium carbonates selected from among chalk, calcite and marble, precipitated calcium carbonate, aluminium or magnesium hydroxides, kaolin, talc, wollastonite and mixtures thereof.

27. Use of the pre-mixtures of mineral filler and polyol as claimed in claims 25 or 26 for the manufacture of flexible, semi-rigid or rigid polyurethane foams by the method, either by foaming without an auxiliary blowing agent or by foaming with an auxiliary blowing agent such as methylene chloride, acetone or  $\text{CO}_2$  or others, and for the manufacture of composite polyurethanes.

28. Use of pre-mixtures of mineral filler and polyol as claimed in claim 25 or 26 for the manufacture of composite materials with a polyurethane matrix, cellular or not, such as polyurethanes reinforced with vegetable fibres or glass or quartz or synthetic fibres, cut fibres in general, or similar, in particular in the field of accessories for the automotive industry, for

the transport sector, in particular road or rail, and industrial accessories used in a variety of applications.

29. Flexible, semi-rigid or rigid polyurethane foams obtained by the method either by foaming without an auxiliary blowing agent or by foaming with an auxiliary blowing agent such as methylene chloride, acetone or CO<sub>2</sub> or others, characterised in that they incorporate a filler pre-treated as claimed in any one of claims 10 to 20.

30. Composite polyurethanes, cellular or not, characterised in that they incorporate a filler pre-treated as claimed in any one of claims 10 to 20.

31. Objects, moulded or not, characterised in that they are obtained from foams and composite polyurethanes obtained as claimed in claim 29 or 30.